TO: Interested Parties

FROM: John Hogan

DATE: 29 April 2002

SUBJECT: Summary of Proposed 2002 Seattle Energy Code

The public process to update the Seattle Energy Code has been underway since January 2002. The process has addressed the incorporation of existing Seattle amendments into the new 2001 Washington State Energy Code (WSEC) and the three tasks listed in Ordinance 120525.

This document includes:

- Recommendations for two tasks in Ordinance 120525: exterior lighting and RS-29;
- A summary of how the 2001 Washington State Energy Code affects existing Seattle amendments;
- Draft clarifications to six existing Seattle amendments; and
- A summary of changes adopted for the 2001 Washington State Energy Code.

For further information, refer to the Seattle Energy Code website or contact me (206-386-9145) or Michael Aoki-Kramer (206-684-7932).

SUMMARY OF
2002 SEATTLE ENERGY CODE PROPOSAL

This document is a companion to the draft ordinance that contains Seattle amendments to the 2001 Washington State Energy Code. Most of this year's ordinance will consist of carrying over amendments that are already included in the 2001 Seattle Energy Code - a housekeeping measure in response to the Washington State Energy Code revisions. (For more information on the 2001 Washington State Energy Code, see "Summary of Changes for the 2001 Washington State Energy Code" below at page 14.)

A summary of changes to Seattle amendments follows. The amendments apply to nonresidential occupancies. (There are no proposed changes for Group R occupancy.)

The issues are addressed in the following order:

1. Exterior lighting
2. RS-29: Nonresidential building design by systems analysis
3. Carryover of existing Seattle amendments – no changes (except editorial)
4. Carryover of existing Seattle amendments that were adopted in part into the 2001 Washington State Energy Code.
5. Seattle amendments adopted entirely into the 2001 Washington State Energy Code – no amendments proposed.
6. Clarification of existing Seattle amendments.

EXTERIOR LIGHTING

Discussion: Achieve increased exterior lighting efficiency as follows:

1. Limit lighting power allowances for open parking and outdoor areas that are illuminated to 0.15 W/ft^2.
2. Require Full Cutoff for fixtures above 15 feet to limit light trespass and light pollution.
3. Limit lighting power allowances for building façade areas that are illuminated to 0.15 W/ft^2.
4. Allow a limited amount of the building façade allowance to be used for open parking and outdoor areas.
5. Specify lighting power allowances for gas station canopy areas, automobile sales, and other exterior retail sales such as gardening supplies.
6. Indicate intent to for shut-off capability to address unnecessary lighting during nighttime hours.

Proposal: Revise as follows -

1513.5 Automatic Shut-off Controls, Exterior: Exterior lighting, including signs, shall be capable of being automatically switched off during daylight hours and non-use nighttime hours by either a combination of timer and photocell, or a timer with astronomic control. Automatic time switches shall also have program back-up capabilities, which prevent the loss of program and time settings for at least 10 hours, if power is interrupted.

~~**EXCEPTIONS:** Neon lighting in signs.~~

1532 Exterior Lighting Power Allowance: The exterior lighting power allowance shall be calculated separately for (1) covered parking, and (2) outdoor parking, outdoor areas and building exteriors. The lighting in these two areas shall not be traded.

The lighting allowance for covered parking shall be 0.20 W/ft^2, and the allowance for open parking and outdoor areas that are illuminated shall be 0.15 W/ft^2. For open parking and outdoor areas and roadways, luminaires mounted above 15 feet shall meet IESNA requirements for Full Cutoff Luminaires. (Full Cutoff means a luminaire light distribution where zero candela intensity occurs at an angle of 90 degrees above nadir, and all greater angles from nadir.)

The lighting allowance for building exteriors and externally-illuminated signs (including billboards) shall be calculated either by multiplying the building facade area that is illuminated or sign area by 0.15 W/ft^2 or multiplying the building perimeter in feet by 7.5 watts per lineal foot. Any building exterior lighting that exceeds 7.5 watts per lineal foot of total building perimeter is not allowed to be traded with other lighting areas.

EXCEPTIONS: 1. Group U occupancy accessory to Group R-3 occupancy.

2. (Reserved.)

3. The top level of a parking garage is allowed to be included with the covered parking garage category provided that the luminaires on the top level meet IESNA requirements for Full Cutoff Luminaires.

4. For the gas station pump area under canopy only, 1.00 W/ft^2 may be used. For automobile sales area only, and for other exterior retail sales, including but not limited to gardening supplies, 0.50 W/ft^2 may be used. *(Companion change also made to footnote 6 of Table 15-1 to reference Section 1532.)*

CATEGORY	LIGHTING POWER ALLOWANCE	TRADEOFF LIMITATIONS
PARKING AND OUTDOOR AREAS		
Covered Parking	0.20 Watts/square foot	Calculated separately. Trade offs not allowed with other categories.
Open parking and outdoor areas	0.15 Watts/square foot of area that is illuminated	Calculated separately, but see allowance below for use of façade lighting credit
FAÇADE LIGHTING		
Perimeter option	7.5 Watts/lineal foot of building perimeter	Calculated separately, but any wattage allowance not used for façade lighting may be used for open parking and outdoor areas that are illuminated
Surface area option	0.15 Watts/square foot of wall surface area that is illuminated	Calculated separately, but any wattage allowance up to 7.5 Watts/lineal foot of building perimeter that is not used for façade lighting may be used for open parking and outdoor areas that are illuminated

RS-29: NONRESIDENTIAL BUILDING DESIGN BY SYSTEMS ANALYSIS

Discussion: Allow increased credit for innovation as follows:

1. Allow use of prototype building as the standard design in all cases.
2. Change the threshold where built-up systems are required.

Proposal: Revise as follows -

3.4 HVAC Systems and Equipment: For the standard building, the HVAC system used shall be the system type used in the proposed design. If the proposed HVAC system type does not comply with Sections 1432 through 1439 the standard design system shall comply in all respects with those sections.

EXCEPTION: ((~~When approved by the building official, a~~))A prototype HVAC system may be used((~~, if the proposed design system cannot be modified to comply with Sections 1422 and 1432 through 1439,~~)) as a standard design. Use of prototype HVAC systems shall only be permitted for the building types listed below. For mixed-use buildings, the floor space of each building type is allocated within the floor space of the standard building. The specifications and requirements for the HVAC systems of prototype buildings shall be those in Table 3-3.

1. assembly
2. health/institutional
3. hotel/motel
4. light manufacturing
5. office (business)
6. restaurant
7. retail (mercantile)
8. school (educational)
9. warehouse (storage)

TABLE 3-3
HVAC Systems of Prototype Buildings[3]

Use	System #	Remarks
1. Assembly		
a. Churches (any size)	1	
b. ≤ 50,000 ft^2 or ≤ 3 floors	1 or 3	Note 2
c. > 50,000 ft^2 or > 3 floors	3	
2. Health		
a. Nursing Home (any size)	2	
b. ≤ 15,000 ft^2	1	
c. > 15,000 ft^2 and ≤ 50,000 ft^2	4	Note 3
d. > 50,000 ft^2	5	Note 3,4
3. Hotel/Motel		
a. ≤ ((~~3~~))6 Stories	2	Note 6
b. > ((~~3~~))6 Stories	6	Note 7
4. Light Manufacturing	1 or 3	
5. Office		
a. ≤ 20,000 ft^2	1	
b. > 20,000 ft^2 and ((~~either~~)) ≤ ((~~3~~))7 floors ((~~or ≤ 75,000 ft^2~~))	4	
c. > ((~~75,000 or > 3~~))7 floors	5	
6. Restaurant	1 or 3	Note 2
7. Retail		
a. ≤ 50,000 ft^2	1 or 3	Note 2
b. > 50,000 ft^2	4 or 5	Note 2
8. Schools		
a. ≤ 75,000 ft^2 or ≤ 3 floors	1	
b. > 75,000 ft^2 or > 3 floors	3	
9. Warehouse		Note 5

Footnote to Table 3-3: The systems and energy types presented in this table are not intended as requirements or recommendations for the proposed design. Floor areas in the table are the total conditioned floor areas for the listed use in the building. The number of floors indicated in the table is the total number of occupied floors for the listed use.

TABLE 3-3 (Continued)
HVAC System Descriptions for Prototype Buildings[1]

HVAC Component	System #1	System #2
System Description	Packaged rooftop single zone, one unit per zone	Packaged terminal air conditioner with space heater or heat pump, heating or cooling unit per zone
Fan system Design Supply Circulation Rate	Note 10	Note 11
Supply Fan Control	Constant volume	Fan cycles with call for heating or cooling
Return Fan Control	NA	NA
Cooling System	Direct expansion air cooled	Direct expansion air cooled
Heating System	Furnace, heat pump or electric resistance	Heat pump with electric resistance auxiliary or air conditioner with space heater
Remarks	Drybulb economizer per Section 1433, heat recovery if required by Section 1436	No economizer, if not required by Section 1433

TABLE 3-3 (Continued)
HVAC System Descriptions for Prototype Buildings[1]

HVAC Component	System #3	System #4
System Description	Air handler per zone with central plant	Packaged rooftop VAV with perimeter reheat and fan-powered terminal units
Fan system Design Supply Circulation Rate	Note 10	Note 10
Supply Fan Control	Constant volume	Variable Air Volume systems with controls per Section 1438 ((~~forward curved centrifugal fan and variable inlet fans~~))
Return Fan Control	Constant volume	Variable Air Volume systems with controls per Section 1438 ((~~forward curved centrifugal fan and variable inlet fans~~))
Cooling System	Chilled water (Note 12)	Direct expansion air cooled
Heating System	Hot water (Note 13)	Hot water (Note 13) or electric resistance
Remarks	Drybulb economizer per Section 1433, heat recovery if required by Section 1436	Drybulb economizer per Section 1433. Minimum VAV setting per Section 1435 Exception 1, Supply air reset by zone of greatest cooling demand, heat recovery if required by Section 1436

TABLE 3-3 (Continued)
HVAC System Descriptions for Prototype Buildings[1]

HVAC Component	System #5	System #6
System Description	Built-up central VAV with perimeter reheat and fan-powered terminal units	Four-pipe fan coil per zone with central plant
Fan system Design Supply Circulation Rate	Note 10	Note 10
Supply Fan Control	VAV with air-foil centrifugal fan and AC frequency variable speed drive	Fan cycles with call for heating or cooling
Return Fan Control	VAV with air-foil centrifugal fan and AC frequency variable speed drive	NA
Cooling System	Chilled water (Note 12)	Chilled water (Note 12)
Heating System	Hot water (Note 13) or electric resistance	Hot water (Note 13) or electric resistance
Remarks	Drybulb economizer per Section 1433. Minimum VAV setting per Section 1435 Exception 1, Supply air reset by zone of greatest cooling demand, heat recovery if required by Section 1436	No economizer, if not required by Section 1433

Numbered Footnotes for Table 3-3
HVAC System Descriptions for Prototype Buildings

1. The systems and energy types presented in this Table are not intended as requirements or recommendations for the proposed design.
2. For occupancies such as restaurants, assembly and retail that are part of a mixed use building which, according to Table 3-3, includes a central chilled water plant (systems 3, 5, or 6), chilled water system type 3 or 5 shall be used as indicated in the table.
3. Constant volume may be used in zones where pressurization relationships must be maintained by code. Where constant volume is used, the system shall have heat recovery if required by Section 1436. VAV shall be used in all other areas, in accordance with Sections 1432 through 1439.
4. Provide run-around heat recovery systems for all fan systems with a minimum outside air intake greater than 70%. Recovery effectiveness shall be 0.50.
5. If a warehouse is not intended to be mechanically cooled, both the standard and proposed designs shall be calculated assuming no mechanical cooling.
6. The system listed is for guest rooms only. Areas such as public areas and back-of-house areas shall be served by system 4. Other areas such as offices and retail shall be served by systems listed in Table 3-3 for these occupancy types.
7. The system listed is for guest rooms only. Areas such as public areas and back-of- house areas shall be served by system 5. Other areas such as offices and retail shall be served by systems listed in Table 3-3 for these occupancy types.
8. Reserved.
9. Reserved.
10. Design supply air circulation rate shall be based on a supply-air to room-air temperature difference of 20°F. A higher supply-air temperature may be used if required to maintain a minimum circulation rate of 4.5 air changes per hour or 15 cfm per person to each zone served by the system, at design conditions. If return fans are specified, they shall be sized for the supply fan capacity less the required minimum ventilation with outside air,

or 75% of the supply fan capacity, whichever is larger. Except where noted, supply and return fans shall be operated continuously during occupied hours.

11. Fan energy when included in the efficiency rating of the unit as defined in Section 1411, need not be modeled explicitly for this system. The fan shall cycle with calls for heating or cooling.
12. Chilled water systems shall be modeled using a reciprocating chiller for systems with total cooling capacities less than 175 tons, and centrifugal chillers for systems with cooling capacities of 175 tons or greater. For systems with cooling capacities of 600 tons or more, the standard design energy consumption shall be calculated using two centrifugal chillers, lead/lag controlled. Chilled water shall be assumed to be controlled at a constant 44°F. Chiller water pumps shall be sized using a 12°F temperature rise, from 44°F to 56°F, operating at 65% combined impeller and motor efficiency. Condenser water pumps shall be sized using a 10°F temperature rise, operating at 60% combined impeller and motor efficiency. The cooling tower shall be an open circuit, centrifugal blower type sized for the larger of 85°F leaving water temperature or 10°F approach to design wetbulb temperature. The tower shall be controlled to provide a 65°F leaving water temperature whenever weather conditions permit, floating up to design leaving water temperatures at design conditions. Chilled water supply temperature shall be reset in accordance with Section 1432.2.2.
13. Hot water system shall include a natural draft fossil fuel or electric boiler. The hot water pump shall be sized based on a 30°F temperature drop, from 180°F to 150°F, operating at a combined impeller and motor efficiency of 60%. Hot water supply temperature shall be reset in accordance with Section 1432.2.2.

CARRY-OVER OF EXISTING SEATTLE AMENDMENTS – NO CHANGES

The Seattle amendments to the following sections and tables are existing amendments that are being carried over with no changes:

Table 10-5B Default U-Factors for Concrete and Masonry Walls.
Table 10-6 Other than Group R Occupancy: Default U-Factors for Vertical Glazing, Overhead Glazing and Opaque Doors.
1132.2.1 Economizer Capability
1132.2.2 Economizer Capability for Water Source Heat Pump Systems
1132.3 Lighting and Motors.
1133 Change of Occupancy or Use.
1144 Violations and Penalties.
1150 Conflicts With Other Codes.
1161 Severability.
1162 Liability.
1301 Scope.
1311.6 Radiant Floors.
1312.2 Solar Heat Gain Coefficient and Shading Coefficient.
1322 Opaque Envelope.
1323 Glazing.
1331 General.
1333 UA Calculations.
Table 13-1 Building Envelope Requirements.
1402 Mechanical Ventilation.
1411.2 Rating Conditions.
1411.4 Packaged Electric Heating and Cooling Equipment.
1411.5 Heating Systems in Unenclosed Spaces.
1412.2 Deadband Controls.
1412.4 Setback and Shut-Off.

1412.6 Combustion Heating Equipment Controls.
1412.8 Enclosed Parking Garage Ventilation.
1413.5 Economizer Heating System Impact. (Renumbered Section 1413.4 from 2001 SEC due to addition of Section 1413.4, Humidification, in 2001 WSEC)
1414.1 Sealing.
1414.2 Insulation.
1416 Completion Requirements (includes commissioning).
1421 System Type.
1421.1 System Sizing Limits.
1431.2 System Sizing Limits.
1432.2.2 Hydronic Systems.
1435 Simultaneous Heating and Cooling.
1436 Heat Recovery.
1437 Electric Motor Efficiency.
1438 Variable Flow Systems and System Criteria.
1440 Service Water Heating.
Table 14-1H-J Reserved
Table 14-1K IPLV/NPLV for Water Cooled Chiller <150 Tons
Table 14-1L IPLV/NPLV for Water Cooled Chiller ≥150 Tons, <300 Tons
Table 14-1M IPLV/NPLV for Water Cooled Chiller ≥300 Tons
1501 Scope.
Figure 15A Lighting and Motor Compliance Options.
1512 Exempt Lighting.
1513.1 Local Control and Accessibility.
1513.6 Automatic Shut-Off Controls, Interior.
1513.6.1 Occupancy Sensors.
1521 Prescriptive Interior Lighting Requirements.
1530 Lighting Power Allowance Option.
1540 Transformers.
RS-29, Section 3.6.5, Parking Garage Ventilation.
Cross-references were updated or added in Sections Table 10-5B, 1411.1, 1413.5, 1416.3.2, 1431.2, and 1438.

CARRY-OVER OF EXISTING SEATTLE AMENDMENTS – PARTIAL ADOPTION INTO 2001 WASHINGTON STATE ENERGY CODE

The Seattle amendments to the following sections and tables are existing amendments that are modified solely because they were adopted in part into the 2001 Washington State Energy Code:

1411.1 General.
1412.4.1 Dampers.
1413.3 Integrated Operation.
1423 Economizers.
1452 Pool Water Heaters.
Table 14-1C Water Chilling Packages, Minimum Efficiency Requirements

SEATTLE AMENDMENTS ADOPTED INTO THE 2001 WASHINGTON STATE ENERGY CODE

The previous Seattle amendments to the following sections have now been adopted into the Washington State Energy Code and so no Seattle amendments are proposed:

1401 Scope.

1433 Economizers.

Table 14-1A Unitary Air Conditioners and Condensing Units, Electrically Operated, Minimum Efficiency Requirements

Table 14-1B Unitary and Applied Heat Pumps, Electrically Operated, Minimum Efficiency Requirements

Table 14-1D Packaged Terminal Air Conditioners, Packaged Terminal Heat Pumps, Room Air Conditioners, and Room Air Conditioner Heat Pumps, Electrically Operated, Minimum Efficiency Requirements

Table 14-1E Warm Air Furnaces and Combination Warm Air Furnaces/Air Conditioning Units, Warm Air Duct Furnaces and Unit Heaters, Minimum Efficiency Requirements

Table 14-1F Boilers, Gas- and Oil-Fired, Minimum Efficiency Requirements

Table 14-4 Energy Efficient Electric Motors Minimum Nominal Full-Load Efficiency

CLARIFICATION OF EXISTING SEATTLE AMENDMENTS

The proposed clarifications are limited to the following:

- Table 10-5A: Technical correction so the default table for metal stud walls corresponds with ASHRAE/IESNA Standard 90.1, the basis for the 2001 SEC wall U-factors.
- 1132.3: Clarify lighting control requirements: for occupancy sensors when new wiring is installed; and when new enclosed spaces are created but lighting fixtures are not changed.
- 1310.2: Clarify criteria for overhead fenestration consistent with Table 10-6.
- 1312.2: Clarify methodology for determining visible transmittance (VT).
- 1416.3.1 Editorial revision to remove a requirement duplicated in Section 1416.3.2
- 1512.1: Clarify the sections from which specific spaces are exempted.
- 1512.2: Clarify exemption for audio-visual and video-conferencing lighting.
- 1513.3: Clarify application of the multi-level switching option for single-lamp fixtures and the level of dimming required.

Table 10-5A: Default U-factors for Overall Assembly Metal Stud Walls, Effective R-values for Metal Framing and Cavity Only, and Default Metal Building U-factors.

Discussion: Technical correction so the default table for metal stud walls corresponds with ASHRAE/IESNA Standard 90.1, the basis for the 2001 SEC wall U-factors.

Proposal: Revise as follows -

TABLE 10-5A
DEFAULT U-FACTORS FOR OVERALL ASSEMBLY METAL STUD WALLS, EFFECTIVE R-VALUES FOR METAL FRAMING AND CAVITY ONLY, AND DEFAULT METAL BUILDING U-FACTORS

Group R Occupancy:
Overall Assembly U-Factors for Metal Stud Walls

Metal Framing	R-Value of Continuous Foam Board Insulation	Cavity Insulation					
		R-11	R-13	R-15	R-19	R-21	R-25
16" o.c.	R-0 (none)	U-0.14	U-0.13	U-0.12	U-0.10	U-0.097	U-0.091
	R-1	U-0.12	U-0.12	U-0.11	U-0.094	U-0.089	U-0.083
	R-2	U-0.11	U-0.010	U-0.099	U-0.086	U-0.081	U-0.077
	R-3	U-0.10	U-0.095	U-0.090	U-0.079	U-0.075	U-0.071
	R-4	U-0.091	U-0.087	U-0.082	U-0.073	U-0.070	U-0.067
	R-5	U-0.083	U-0.080	U-0.076	U-0.068	U-0.065	U-0.062
	R-6	U-0.077	U-0.074	U-0.071	U-0.064	U-0.061	U-0.059
	R-7	U-0.071	U-0.069	U-0.066	U-0.060	U-0.058	U-0.055
	R-8	U-0.067	U-0.064	U-0.062	U-0.057	U-0.055	U-0.053
	R-9	U-0.062	U-0.060	U-0.058	U-0.054	U-0.052	U-0.050
	R-10	U-0.059	U-0.057	U-0.055	U-0.051	U-0.049	U-0.048
24" o.c	R-0 (none)	U-0.13	U-0.12	U-0.11	U-0.091	U-0.085	U-0.079
	R-1	U-0.11	U-0.10	U-0.098	U-0.084	U-0.078	U-0.073
	R-2	U-0.10	U-0.091	U-0.089	U-0.077	U-0.073	U-0.068
	R-3	U-0.092	U-0.083	U-0.082	U-0.072	U-0.068	U-0.064
	R-4	U-0.084	U-0.077	U-0.076	U-0.067	U-0.063	U-0.060
	R-5	U-0.078	U-0.071	U-0.070	U-0.063	U-0.060	U-0.057
	R-6	U-0.072	U-0.067	U-0.066	U-0.059	U-0.056	U-0.054
	R-7	U-0.067	U-0.063	U-0.062	U-0.056	U-0.053	U-0.051
	R-8	U-0.063	U-0.059	U-0.058	U-0.053	U-0.051	U-0.048
	R-9	U-0.059	U-0.056	U-0.055	U-0.050	U-0.048	U-0.046
	R-10	U-0.056	U-0.053	U-0.052	U-0.048	U-0.046	U-0.044

Other than Group R Occupancy:
Overall Assembly U-Factors for Metal Stud Walls

Metal Framing	R-Value of Continuous Foam Board Insulation	Cavity Insulation					
		R-0	R-11	R-13	R-15	R-19	R-21
16" o.c.	R-0 (none)	U-0.352	U-0.132	U-0.124	U-0.118	U-0.109	U-0.106
	R-1	U-0.260	U-0.117	U-0.111	U-0.106	U-0.099	U-0.096
	R-2	U-0.207	U-0.105	U-0.100	U-0.096	U-0.090	U-0.087
	R-3	U-0.171	U-0.095	U-0.091	U-0.087	U-0.082	U-0.080
	R-4	U-0.146	U-0.087	U-0.083	U-0.080	U-0.076	U-0.074
	R-5	U-0.128	U-0.080	U-0.077	U-0.074	U-0.071	U-0.069
	R-6	U-0.113	U-0.074	U-0.071	U-0.069	U-0.066	U-0.065
	R-7	U-0.102	U-0.069	U-0.066	U-0.065	U-0.062	U-0.061
	R-8	U-0.092	U-0.064	U-0.062	U-0.061	U-0.058	U-0.057
	R-9	U-0.084	U-0.060	U-0.059	U-0.057	U-0.055	U-0.054
	R-10	U-0.078	U-0.057	U-0.055	U-0.054	U-0.052	U-0.051
24" o.c	R-0 (none)	U-0.338	U-0.116	U-0.108	U-0.102	U-0.094	U-0.090
	R-1	U-0.253	U-0.104	U-0.098	U-0.092	U-0.086	U-0.083
	R-2	U-0.202	U-0.094	U-0.089	U-0.084	U-0.079	U-0.077
	R-3	U-0.168	U-0.086	U-0.082	U-0.078	U-0.073	U-0.071
	R-4	U-0.144	U-0.079	U-0.075	U-0.072	U-0.068	U-0.066
	R-5	U-0.126	U-0.073	U-0.070	U-0.067	U-0.064	U-0.062
	R-6	U-0.112	U-0.068	U-0.066	U-0.063	U-0.060	U-0.059
	R-7	U-0.100	U-0.064	U-0.062	U-0.059	U-0.057	U-0.055
	R-8	U-0.091	U-0.060	U-0.058	U-0.056	U-0.054	U-0.052
	R-9	U-0.084	U-0.057	U-0.055	U-0.053	U-0.051	U-0.050
	R-10	U-0.077	U-0.054	U-0.052	U-0.050	U-0.048	U-0.048

1132.3 Lighting and Motors.

Discussion: Clarify lighting control requirements: for occupancy sensors when new wiring is being installed; and when new enclosed spaces are created but lighting fixtures are not being changed.

Proposal: Revise as follows -

1132.3 Lighting and Motors: Where the use in a space changes from one use in Table 15-1 to another use in Table 15-1, the installed lighting wattage shall comply with Section 1521 or 1531.

Other tenant improvements, alterations or repairs where 60 percent or more of the fixtures in a space enclosed by walls or ceiling-height partitions are new shall comply with Sections 1531 and 1532. (Where this threshold is triggered, the areas of the affected space may be aggregated for code compliance calculations.) Where less than 60 percent of the fixtures in a space enclosed by walls or ceiling-height partitions are new, the installed lighting wattage shall be maintained or reduced.

Where 60 percent or more of the lighting fixtures in a suspended ceiling are new, and the existing insulation is on the suspended ceiling, the roof/ceiling assembly shall be insulated according to the provisions of Chapter 13, Section 1311.2.

Where new wiring is being installed to serve added fixtures and/or fixtures are being relocated to a new circuit, controls shall comply with Sections 1513.1 through 1513.5. In addition, office areas less than 300 ft^2 enclosed by walls or ceiling-height partitions, and all meeting and conference rooms, and all school classrooms, shall be equipped with occupancy sensors that comply with Section 1513.6. Where a new lighting panel (or a moved lighting panel) with all new raceway and conductor wiring from the panel to the fixtures is being installed, controls shall also comply with the other requirements in Section 1513.6.

Where new walls or ceiling height partitions are added to an existing space and create a new enclosed space, but the lighting fixtures are not being changed, other than being relocated, the new enclosed space shall have controls that comply with Sections 1513.1 through 1513.2 and 1513.4 through 1513.6.

Those motors which are altered or replaced shall comply with Section 1511.

1310.2 Semi-Heated Spaces.

Discussion: Clarify criteria for overhead fenestration consistent with Table 10-6.
Proposal: Revise as follows -

1310.2 Semi-Heated Spaces:

…

g. For fenestration, U-0.90 maximum for vertical glazing and U-1.08 maximum for overhead glazing and a maximum total (vertical and overhead) area of 10% of the gross wall area.

…

1312.2 Solar Heat Gain Coefficient and Visible Transmittance.

Discussion: Clarify methodology for determining visible transmittance (VT). Visible transmittance is referenced in 1323, Exception 1.
Proposal: Revise as follows -

1312.2 Solar Heat Gain Coefficient and Visible Transmittance: Solar Heat Gain Coefficient (SHGC) and visible transmittance (VT), shall be determined, certified and labeled in accordance with the National Fenestration Rating Council (NFRC) Standard by a certified, independent agency, licensed by the NFRC.

EXCEPTIONS: 1. Shading coefficients (SC) or solar heat gain coefficient for the center of glass shall be an acceptable alternate for compliance with solar heat gain coefficient requirements. Shading coefficients or solar heat gain coefficient for the center of glass for glazing shall be taken from Chapter 30 of Standard RS-27 or from the manufacturer's data using a spectral data file determined in accordance with NFRC 300.

2. For the purposes of 1323, Exception 1, visible transmittance for the center of the glazing assembly shall be taken from Chapter 30 of Standard RS-27 or from the manufacturer's data using a spectral data file determined in accordance with NFRC 300.

Note that using the exception for the SHGC for the center-of-glass does not give the full credit for the overall product (including the frame) that the NFRC-certified SHGC does.

Though the SHGC for the frame is not zero (the ASHRAE Handbook of Fundamentals indicates that the SHGC can range from 0.11-0.14 for metal frames and from 0.02 to 0.07 for wood/vinyl/ fiberglass frames), the SHGC for the frame is invariably lower than that for the glass. Consequently, an NFRC-certified SHGC will generally be lower.

Conversely, the VT for the center-of-glass overstates the VT for the overall product (including the frame). The VT for the frame is zero. Consequently, an NFRC-certified VT will always be lower. For this reason, Exception 2 to Section 1312.2 is only applicable to Exception 1 in Section 1323. It is not applicable to other sections.

1512.2 Exempt Lighting Equipment.

Discussion: Clarify exemption for audio-visual and video-conferencing lighting.
Proposal: Revise as follows -

1512.2 Exempt Lighting Equipment: The following lighting equipment and tasks are exempt from the lighting requirements of Section 1520 and need not be included when calculating the installed lighting power under Section 1530 but shall comply with all other requirements of this chapter. All other lighting in areas that are not exempted by Section 1512.2, where exempt tasks and equipment are used, shall comply with all of the requirements of this chapter.

1. Special lighting needs for research.
2. Emergency lighting that is automatically OFF during normal building operation.
3. Lighting integral to signs.
4. Lighting that is part of machines, equipment or furniture.
5. Lighting that is used solely for indoor plant growth during the hours of 10:00 p.m. to 6:00 a.m. However, such lighting shall not be exempt unless it is in addition to general area lighting, is located in a separate fixture, and is controlled by an independent control device.
6. Lighting for theatrical productions, television broadcasting (including sports facilities), and special effects lighting for stage areas and dance floors in entertainment facilities. However, such lighting shall not be exempt unless it is in addition to general area lighting, is located in a separate fixture, and is controlled by an independent control device.
7. Lighting in galleries, museums and in main building entry lobbies for exhibits, inspection, and restoration. However, such lighting shall not be exempt unless it is in addition to general area lighting, is located in a separate fixture, and is controlled by an independent control device.
8. Exterior lighting for public monuments.
9. Lighting specifically designed for use only during medical or dental procedures and lighting integral to medical equipment. However, such lighting shall not be exempt unless it is in addition to general area lighting, designed specifically for medical lighting, and is controlled by an independent control device.
10. Lighting integral to or specifically for food warming and food preparation equipment. However, such lighting shall not be exempt unless it is in addition to general area lighting, is located in a separate fixture, and is controlled by an independent control device.

11. Audio-visual and video-conferencing lighting with multi-level or dimming controls in rooms with permanently installed audio-visual equipment or video-conferencing equipment.

1513.3 Daylight Zone Controls.

Discussion: Clarify application of the multi-level switching option for single-lamp fixtures and the level of dimming required.

Proposal: Revise as follows -

1513.3 Daylight Zone Control: All daylighted zones, as defined in Chapter 2 (see Exhibits 1513.3a and 1513.3b), both under overhead glazing and adjacent to vertical glazing, shall be provided with controls which

a. control the lights independent of general area lighting, and

b. <u>automatically reduce lighting power in response to available daylight by either</u>

   i. <u>a combination of</u> multi-level switching and daylight-sensing automatic controls, which are capable of reducing the light level automatically and turning the lights off(where single lamp luminaires are installed, automatically switching 50% of the luminaires off is an acceptable means of reducing the light level), or

   ii. <u>a combination of</u> dimming ballasts and daylight-sensing automatic controls, which are capable of dimming the lights continuously.

Contiguous daylight zones adjacent to vertical glazing are allowed to be controlled by a single controlling device provided that they do not include zones facing more than two adjacent cardinal orientations (i.e. north, east, south, west). Daylight zones under overhead glazing more than 15 feet from the perimeter shall be controlled separately from daylight zones adjacent to vertical glazing.

EXCEPTIONS: 1. Daylight spaces enclosed by walls or ceiling height partitions and containing 2 or fewer light fixtures are not required to have a separate switch for general area lighting.

2. HID lamps with automatic controls that are capable of reducing the light level by at least 50% in lieu of continuous dimming controls in 1513.3b.

3. HID lamps 150 watts or less are exempt from the dimming requirements in 1513.3b.

SUMMARY OF CHANGES FOR THE 2001 WASHINGTON STATE ENERGY CODE

Below is a section-by-section summary of changes for the 2001 Washington State Energy Code. The primary changes were to the residential (Group R occupancy) building envelope requirements and to the nonresidential (other than Group R occupancy) mechanical requirements. Many of the nonresidential changes incorporated requirements that had been previously adopted into the Seattle Energy Code.

RESIDENTIAL (Group R Occupancy)

Section	Subject	Summary
502.1.5	Glaz. U-factors	Update table references.
502.1.5.2	Door U-factors	Clarifies that glazing in all doors is included in glazing area calculations.
503.4	HVAC equip.	Equipment to comply with (a) National Appliance Energy Conservation Act, and (b) 1411 (for consistency with nonresidential).
Table 5-1	Target UA	Criteria for electric resistance space heat unchanged. Criteria for other space heating system types now the same as electric resistance except for walls which are unchanged.
Tables 5-4 to 5-8		Deleted as companion change to 503.4.
601	Scope	Update table references.
602	Bldg. envelope	Update table references.
602.2	Walls	Companion change to Tables 6-1 & 6-2, specifies three options for complying with the R-21 wall insulation criteria (R-19 options deleted).
602.7	Glazing	Companion change to Tables 6-1 & 6-2, area of single-glazed windows and double-glazed garden windows to be tripled for calculation of compliance.
602	Mech. systems	Update table references.
Table 6-1	Zone 1 envel.	Previous Tables 6-1 and 6-2 combined into one Table 6-1: (a) prescriptive requirements now the same for all space heating types; (b) reference case similar to previous electric resistance reference case but wall insulation increased to R-21 min.; (c) prescriptive options reduced to two for most Group R occupancy, with a maximum glazing area of 15% of the floor area (must use Chap. 4 or 5 if glazing area is larger); (d) third prescriptive option for Group R-3 occupancy only that allows unlimited glazing.
Table 6-2	Zone 2 envel.	Previous Tables 6-3 and 6-4 combined into one Table 6-2, parallel changes to those for Climate Zone 1.
Tables 6-3 to 6-6		Deleted as companion change to Tables 6-1 & 6-2.
900	Equip. sizing	Prescriptive sizing limit of 20 Btu/h•ft^2 in Climate Zone 1 and of 25 Btu/h•ft^2 in Climate Zone 2.

NONRESIDENTIAL (Other than Group R Occupancy)

Section	Subject	Summary
1401	Mech. scope	Exception deleted. *(Incorporates 2001 Seattle Energy Code amendment.)*
1411.1	Equip. effic.	Update table references. Furnaces to intermittent ignition device, mechanical draft or flue damper, and limited jacket losses – same as ASHRAE/IESNA Standard 90.1-2001. *(Incorporates 2001 Seattle Energy Code amendment.)*
1412.4.1	Dampers	Air intake, exhaust and relief to have motorized dampers in most cases, dampers to have air leakage limits – similar to ASHRAE/IESNA Standard 90.1-2001. *(Incorporates 2001 Seattle Energy Code amendment.)*
1413	Economizer	Air economizer to be base case in RS-29 analysis, water economizer criteria and documentation specified, integrated operation required for air and water systems (with exceptions), humidification criteria specified. *(Similar to 2001 Seattle Energy Code amendments.)*
1423	Economizer	Economizer for HVAC serving computer rooms, electronic equipment, radio equipment, and telephone switchgear. *(Similar to 2001 Seattle Energy Code amendment.)*
1433	Economizer	Economizer for HVAC serving computer rooms, electronic equipment, radio equipment, and telephone switchgear; economizer for units 20,000 Btu/h and larger on roof; water economizer limited to 500 tons per building. *(Similar to 2001 Seattle Energy Code amendments.)*
1437	Elec. motors	Update table references.
1452	Pool heaters	Minimum efficiencies established for heat pump pool heaters – same as ASHRAE/IESNA Standard 90.1-2001. *(Incorporates 2001 Seattle Energy Code amendment.).*
Tables 14-1A to G		Update HVAC equipment efficiency tables to national standards – same as ASHRAE/IESNA Standard 90.1-2001. *(Similar to 2001 Seattle Energy Code amendment.)*
Tables 14-1 to 14-3		Deleted as companion change to Tables 14-1A to G.